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Oyster Culture in the US (5)

By Juzo HORI

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C Pacific oyster*

History

As we already explained, the only species of oyster native to the Pacific coast of the US is the small "Olympia" oyster. Since the large demand for oysters cannot be satisfied, oysters from the East coast are being transplanted by railroad every year. Not only are the transcontinental transport costs high but the post-transportation results are generally poor. Moreover, because of the low water temperature, using for production on the west coast seeds collected from east coast oysters has been demonstrated to be difficult. It seemed therefore more practical to turn to Japan for such supplies. In 1899, the director of the Washington state fisheries consulted regarding this matter with Dr. Keikichi MIZUKURI, Professor at the Tokyo Imperial University. On the basis of latitude and such, the latter suggested that the oysters produced in Akkeshi, Hokkaido should be best suited for transplantation in the US. Later however, around 1902-1903, Mr. Hanpei KANAI, an oyster grower of Hiroshima received

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*Translator's note: magaki; Crassostrea gigas (THUNBERG).

orders from Americans residing in Kobe, and in 2 years exported about 2,500 bags of oysters to the US, which oysters were released in the Bellingham oyster culture grounds in the state of Washington. This was the first export of Japanese oysters to the US. We have no detailed information about the results. It seems however that because of the length of the trip by the steamship carrying the oysters from Kobe, many oysters had died and that the results were not good.

Later at the Fisheries Training Center, Mr. Imoo and p. 8
Mr. Marukawa conducted about 3 times from December 1907 to March 1908 tests in exporting Hiroshima oysters from Yokohama to the US and culture was performed at Poulsbo, Puget Sound. On the whole the export results were good. It was ascertained that few individuals die when oysters with hard shell edges are shipped at the appropriate time. Technician Imoo cultivated at the Kanazawa oyster culture grounds of the Fisheries Training Station particularly well shaped oysters for the purpose of export and on a trial basis conducted commercial export to Hawaii and Seattle in North America in February-April 1912. Regarding the death rate for the 30 bags sent, the opinions differed between the receiver, which was the Seattle Oyster & Fish co. and the attending officials. In the end, 5 bags were cultivated in the oyster beds of Vancouver and 25 bags in those of Hood Canal. So, because of the above facts, much time elapsed between landing and release at the culture grounds and the results were not good. In the meantime, the Kikuya store of Tokyo sent to Seattle and to Portland in the US oysters from Kisarazu in the Chiba Prefecture. No details are known. In 1912, technician Motoo of the Fisheries Training Station travelled to the western countries and visited the culture grounds in Washington. He

checked the state of culture and other general conditions and strived to help the export of Pacific oysters. At the same time Mr. Yoshimasa* MIYAGI who ran the "Royal" fisheries Co. in Vancouver, Canada noted that the operations prospects were good and together with Mr. Jiro TSUKIMOTO built culture grounds in the Samish bay, north of Puget Sound. They imported seed oysters from Japan and set up a plan for the culture of Pacific oysters. In 1913, Mr. Miyagi returned for the same business to Japan from the US, visited the culture grounds of the various coastal sites in Japan and as a result, built in 1914 a culture ground in the Mangoku Bay, Miyagi prefecture. To further promote the export operations, with the help of the Fisheries Training Center of the Ministry for Agricultural and Commerce, he started under the guidance of technician IMOO to cultivate oysters for export at the Kanazawa culture grounds of the same Center. Thus, from 1914 for the sake of comparative testing, Mr. Miyagi himself exported every year to Samish Bay in the US between 230 and 2000 boxes of oyster from the Kanazawa oyster culture grounds of the Fisheries Training Center, as well as from culture grounds in Miyagi, Tokyo, Shizuoka and so on. From 1917, the Fisheries Training Center expanded the experimental oyster culture activities for export. By using mainly French-type spat attachments it cultivated oysters of uniform shape which were exported. Unexpectedly the Great War in Europe brought about a shortage in tonnage availability. This and the highly increasing shipping costs became great problems, and the operations became momentarily stagnant. The oysters exported so far had been large. One box contained 700-800

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*Translator's note: reading not quite certain (Aramasa ...?); same hereafter.

oysters ready for immediate consumption. There were also boxes p. 9
containing around 8,000 small oysters used as seed. All were of one type cultivated mainly for export.

After many years of culture in the US both the growth and the yield of the Pacific oysters after transplantation became excellent. However, as the water temperature is low during the summer spawning season, there was the possibility of commercially useful reproduction. It was also demonstrated through comparative tests of seeds from various production places that the products from the Miyagi prefecture were the best suited. So, the US growers were asking for spats that were as small as possible from the Miyagi prefecture.

Basically, the method of collecting spats presently in general use was first proposed by Mr. Yoshimasa MIYAGI, and consists in using shells. As the above was exporting about 400 boxes of oysters from the Miyagi prefecture from the Kanazawa culture grounds, in 1919 he put the shipment inside the hold of the ship for freight related reasons. There were 700-800 large oysters in 1 box. Numerous spats were attached to these shells but nobody paid any attention. However, most of the large oysters died during the trip which caused a general disappointment. Fortunately, the small spats which had escaped attention, survived and after release in the US culture grounds, they grew well to yield an unexpected harvest. Because of this, the present method of collecting seed was conceived and the export of small spats was started.

As the Pacific oyster culture having progressed as described above in the US yielded good results, there was a agradual desire for expansion. However, because of the 1922 bill prohibiting foreigners

from owning land, the Japanese who were without citizenship were legally prevented from owning culture grounds and from conducting business. So the Pacific oyster culture grounds developed at great pain and over many years by Mr. Miyagi and Mr. Tsukimoto were abandoned and transferred to Mr. Steal (?) (mayor of Olympia, a senator and powerful figure holding the important office of head of the Pacific coast oyster cooperative). The company was called Bock Point Oyster Co. It was the first to operate Pacific oyster culture grounds in the US and is presently continuing business. The Pacific oyster culture business which because of the above events had momentarily stagnated was later recognized as extremely profitable by the Americans. The trade routes multiplied year by year. From about 1925 business fever rose strongly, and the numbers of exported spat bags increased sharply. At the present time most of the seeds are produced in the Miyagi Prefecture. The recent export figures are as follows.

Year	Volume of export
1928	8,000 boxes
1929	14,000
1930	16,566
1931	30,453
1932	47,392
1933	68,103
1934	65,007

p. 10

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The table shows the volumes of export for the seed produced in the Miyagi Prefecture. There were also small tentative exports from

the Hiroshima, Aichi and Chiba prefectures. However, the results after release and culture were not up to the results obtained with products from the Miyagi prefecture. So the export of seed became practically a monopoly of the Miyagi prefecture.

The Pacific oyster culture grounds in North America

Pacific oyster beds are found in North America from British Columbia in Canada in the north to the states of Washington, Oregon, California in the US with its center in Washington. In the latter state there are wide culture grounds doing excellent business. These include most of the Pacific oyster production along the Pacific coast. More than 95% of the seed oysters exported from Japan are presently released in the culture grounds of these same states.

The main Pacific oyster farms along the Pacific coast are the following:

Canada, B.C.	Washington state
Boundary Bay	Grays Harbor
Pender Harbor	Liberty Bay
Deep Bay (Vancouver Island)	Mud Bay
Fanny Bay "	North Bay
Ladysmith Harbor	Padilla Bay
Mud Bay "	Samish Bay
Nanootse Bay "	Shelton
Oregon State	Stanwood
Coos Bay	Willapa Harbor
Netart Bay	**California state**

↓ p.7

↓ p.7

Yaquina Bay — South San Francisco Bay

Tillamook Bay — Moss Landing (Monterey)

The names of the operators are omitted (editor)

Oyster seeds p. 11

The shells presently in general use for the export of seed oysters are shells (oyster, bay scallops, scallops, akazara, abalone and such) to which oyster spats are allowed to get attached. So, at the production season of spring and summer, numerous long pieces of wire of about 5 feet are passed through the above shells and placed horizontally or vertically on racks previously installed in the sea, and used to collect seeds. If the collected spats are left as they are for a long time at the site, the shells will grow and become too large for export. So, the shells are transferred in September, October to shallow sites and the immersion period is shortened so as to inhibit the growth. In the Miyagi prefecture this is called "bed lifting" or "rack lifting". Few large seed oysters can be held in one box. Moreover, the edges of the shell get damaged during packing and shippinc so that some oysters die. This is why the US culture operators ask for seeds that are as small as possible. In the Miyagi prefecture, the Oyster Fisheries Cooperative established inspection norms for export seed oysters and examines prior to packing the size of the boxes, the numbers of spats, the size of the spats, the presence or absence of predators, issues a label of approval for the approved products, which label is attached to the boxes to be exported. The inspection norms are as follows:

- o Size of box length: 86 cm; width: 41 cm; depth: 27 cm
- o The seed is fully alive
- o The size of seed ranges from 6 mm to 18 mm, and one box contains at least 10,000 individual spats
- o No predators and more especially no spiral shellfish are attached
- o There are no impurities, no soiled mud and such
- o On one of the above shells (attachment devices) there are at least 20 spats attached according to the norm. This rule was changed in 1934. One box must contain at least 10,000 individuals. The number of spats in one box ranges usually from 10,000 to 15,000. When the spats are well attached the number could reach up to 20,000. Every year, prior to the export period, the producers and the exporters meet at the oyster fisheries cooperative to set the minimum price for the year. p. 12

When packing the seed for export, the attachment devices are packed as such in the boxes or they are cut into pieces prior to being packed. The former ones are after exportation released in culture grounds with much bottom mud while the latter are used for release in culture ground with relatively hard floors such as sand. One started to cut the shells in small pieces several years ago. The shells are cut into 2-4 fragments with a hay cutter like tool. When cutting into small pieces, the number of spats increases two or threefold inside the box. After the oysters have grown following transplantation to the US; the numerous oysters attached to uncut attachments form large round lumps. Their shape becomes elongated, and stripping the shells is costly. Another defect is that damage may be caused at stripping time.

This is why cutting is now done prior to export. The individuals separated through cutting grow in a round shape and the post-transplantation costs are low so that the division is requested by numerous oyster growers in the US. Most export seeds undergo presently such division.

Export takes place from around November to March of the following year. Most of the export is done from February to March. This time is most advantageous on account of the temperature during shipping and of the preparations to be made at culture grounds where the seed must be released. Shipping was formerly carried out by passenger ship from Yokohama. Recently the shipping is done by cargo ships from Shiogama. The trip to the US takes about 16 days which is more than by passenger ship but the cost is lower. The oysters can safely reached their destination within this period of time. The landing ports in the US are Victoria, Vancouver, Anacortes, Seattle, Southbend and so on. After leaving Shiogama, the ships travel directly in their destination.

As already explained, most exported seed is produced in the Miyagi prefecture. Other seeds from Chiba, Aichi, Hiroshima and so on are sent in very small amounts only and on an experimental basis.

The seed is produced in large quantities in the two bays of Matsushima and Mangoku in the Miyagi prefecture. The quality is good and best growth is achieved in the US after transplantation. Growth is even so good in some places that it causes problems. We observed the state of growth of seed from the Aichi prefecture transplanted in Pender Harbour about 40 nautical miles north of Vancouver in America. The growth was much more reduced than for seed from the Miyagi

prefecture. Of course, these oysters were from the beginning not intended for the kind of growth exhibited by the products from the Miyagi prefecture but had been transplanted to substitute for the expensive "Olympia" oysters. One wished that the shell would not grow too big. However, these oysters are a little too big to substitute for Olympia oysters and a little small to be sold as ordinary Pacific oysters. As the growth is mediocre, volumes are not increasing very much. For the time being, these oysters are sold for the same price as "Olympia" oysters. At $5 for a gallon the price is 4-5 times higher than that of Pacific oysters. Compared to products from the Miyagi prefecture which grow more than 20 times bigger, the profit is evidently extremely poor.

We observed thereafter one-year culture of seed from the Hiroshima prefecture at the New Washington Culture Co. of the Willapa Bay. The growth was poor indeed. The results were definitely not good as compared to those obtained with products from the Miyagi prefecture cultured for the same period of time (see Fig. 10). It could however be that the growth was especially poor because the oyster seed sent had been stunted by two winters. The same could be the case for the product from the Aichi prefecture. If one transplanted seed from the Miyagi prefecture which had been stunted by two winters, the same results might be obtained. Some oyster growers of the Willapa Bay say that seed from Hiroshima was growing fairly well. It could be that what we observed represented particularly poor results due to the transplantation of two-winter oysters. The main officer of the above culture company, Mr. Sentaro MURAKAMI (from the prefecture of Hiroshima) said that in the past he had tried to cultivate seed

p. 14

purchased from the Hiroshima prefecture in a place called North Bay in Puget Sound and that the growth had been acceptable. However, even in the winter, the flesh would not become tight and was "milky". The stripping fluid was clouded white and selling was very hard. In the end failure occurred. The reason seems to be that even with "milky" in the winter, the reproduction elements are not completely absorbed but remain. This condition however depends on the climate, and this phenomenon appears in some years. One may think that this is not necessarily limited to the sole products of the Hiroshima prefecture.

(to be continued)

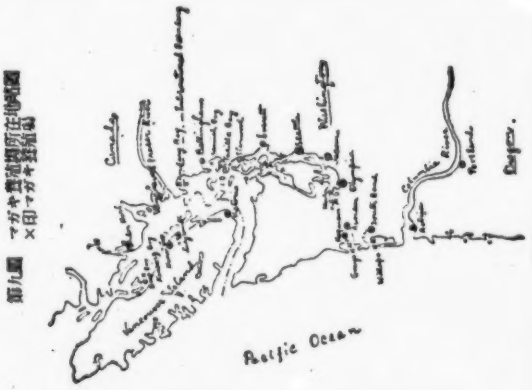
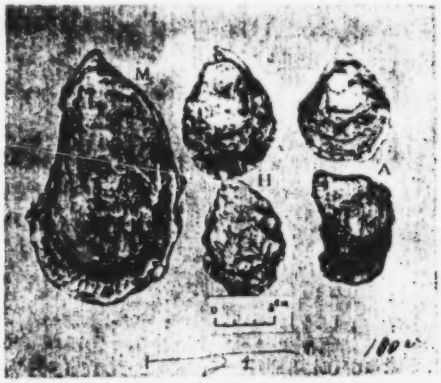


Fig. 9: Locations of the Pacific oyster farms

x: Pacific oyster farm



第十圖 カキ成長度比較

(何れも移殖後満一ヶ年半を経たるもの)

A 愛知縣産カキ

H 廣島縣産カキ

M 宮城縣産カキ

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Fig. 10: Compared growths of oysters (in all cases after a full year from transplantation time)

A oysters from the Aichi prefecture
H oysters from the Hiroshima prefecture
M oysters from the Miyagi prefecture